REMARKS

A review of the claims indicates that:

A) Claims 3-14, 21, 24-27, 29, 31 and 32 remain in their original form.

B) Claims 2, 15, 17-20, 22 and 28 are currently amended.

C) Claims 1 and 30 are previously presented.

D) Claims 16 and 23 were previously cancelled.

In view of the following remarks, Applicant respectfully requests reconsideration of the rejected claims and withdrawal of the rejections.

Traversal of the §101 Rejections

Claims 1 were rejected under §101 as being directed toward non-statutory subject matter. In particular, the Office suggests that the claims are directed to a label. The Applicant respectfully disagrees.

The Applicant's Claim 1 recites "a label", but that label includes "an object" that has "randomly distributed features" along with encoded (printed) data. Thus, the label includes "an object" which has "features" which are "randomly distributed". Thus, the label recited in the claim is not simply "printed matter," but an article of manufacture. In particular, the object (often referred to in the specification as the "authentication object 100" is an article of manufacture that is affixed to the label. Moreover, all of Claims 1, 15, 22 and 28 recite the "object" or "authentication object". Accordingly, the Applicant respectfully submits that the claims are directed to statutory subject matter. However, the Applicant would be happy to talk with the Examiner about this issue, and to seek resolution.

Traversal of the §102 Rejections

Claims 1-12, 14-15, 17-22 and 24-32 were rejected under §102(b) as being

anticipated by U.S. Patent No. 5,974,150, hereinafter "Kaish." In response, the Applicant submits that the Office has failed to establish a *prima facie* case of anticipation and, in view of the comments below, respectfully traverses the Office's rejections.

Claim 1 recites a method comprising:

- determining randomly distributed features in an object;
- **determining a probability density function associated with the object;**
- compressing data representing the randomly distributed features, **wherein the compressing is based in part on the probability density function;**
- encoding the compressed data with a signature; and
- creating a label comprising the object and the encoded data.

Claim 1 has not been amended with this response, and therefore remains "previously presented".

The Applicant respectfully submits that Kaish does not show or disclose, among other things, (1) a probability density function, and (2) basing compression in part on the probability density function. Therefore, the Applicant submits that Kaish does not show or disclose elements recited by Claim 1. Accordingly, the Applicant respectfully requests that the Section 102 rejection of Claim 1 be removed.

Issue 1, Probability Density Functions.

Claim 1 recites, "determining a probability density function associated with the object". The Applicant respectfully submits that probability density functions are not taught by Kaish, and requests that the Section 102 rejection of Claim 1 be removed.

The Kaish Reference.

Referring to Kaish, at column 28 lines 7—16 (particularly at line 12), a discussion of compression is seen. In particular, Kaish discloses that a plurality of regions can each be associated with a vector in two or more dimensions. Such an association constitutes an irreversible compression of the data derived from that region.

Additionally, Claims 8 and 10 of Kaish disclose the use of compression. Claim 8 discloses compression of a message, while Claim 10 discloses irreversible compression. In these locations, Kaish again fails to show or disclose the use of a probability density function generally, and more specifically, a probability density function associated with compression.

Referring to column 24 lines 34—61 of Kaish, two references to probability are seen. The discussion wherein the references are made is directed to a formula for determining the required power of a laser (column 24, lines 34—38). At line 43, the probability of photon absorption is referred to as A_c. At line 55, the probability is assigned a value of 0.05, in an effort to determine the laser power level required. Thus, Kaish discusses the probability of photon absorption as related to the power required for the laser. Kaish does not discuss a probability density function related to compression.

The Rejection of Claim 1.

The Patent Office suggests that Kaish teaches a probability density function at: Column 12, lines 53-59; Column 12 lines 4-10; Column 20 lines 48-55; and Column 16 lines 27-37. The Applicant respectfully disagrees.

Remarks concerning the Kaish reference.

The Applicant will refer to these sections in turn. Referring to column 12, at lines 53-59, Kaish discloses that the locations of the fibers can be random, that they are determined, that this data is then encrypted with a private key, and that therefore the encrypted data (which may be decrypted by anyone using the public key and compared to a scan of the object) provides a level of security. In particular, since known duplication systems are not capable of inexpensively reproducing the fibers at the desired locations (as indicated by the encrypted data) the certificate is secure. However, Kaish fails to show or disclose a probability density function that yields the probability of the fiber locations once determined. Accordingly, the Applicant submits that Kaish fails to show or disclose the recited claim element.

Referring to column 12, at lines 4-10, Kaish discloses that fibers in one substrate are patterned in a completely independent manner from fibers in another substrate. Accordingly, examination of one substrate is not helpful to reveal the fibers (and therefore code) associated with another substrate. However, Kaish fails to show or disclose a probability density function that yields the probability of the fiber locations once determined. Accordingly, the Applicant submits that Kaish fails to show or disclose the recited claim element.

Referring to column 20, at lines 48-66, Kaish discloses the use of dye and polymer chains. The Applicant submits that Kaish fails to show or disclose a probability density function that yields the probability of the fiber locations once determined. Accordingly, the Applicant submits that Kaish fails to show or disclose the recited claim element.

Referring to column 16, at lines 27-37, Kaish discloses that the unique characteristics of the label (e.g. the exact location of the randomly located fibers) can be discovered, and that information encrypted to make the label, which can then be authenticated by third parties. Such a certificate can be printed on the label. However, Kaish fails to show or disclose a probability density function that yields the probability of the fiber locations once determined. Accordingly, the Applicant submits that Kaish fails to show or disclose the recited claim element.

Probability Functions.

As an example only, for purposes of discussion, the Applicant points to the Applicant's specification at pages 13-20 (and other locations) and Figs. 6-9 (and other locations) for a discussion of probability, and how it can be used in an authentication object.

Conclusion.

Therefore, a thorough review of Kaish does not show or disclose the use of a probability density function. Moreover, the use of such a probability density function in a compression of data is also not shown. Accordingly, the Applicant respectfully requests that the Section 102 rejection of Claim 1 be removed.

Issue 2, Compression based in part on a Probability Density Function.

Claim 1 recites, "wherein the compressing is based in part on the probability density function". The Applicant respectfully submits that compression using a probability density function us not taught by Kaish, and requests that the Section 102 rejection of Claim 1 be removed.

The Kaish Reference.

The Kaish reference teaches compression. However, the Applicant

respectfully submits a thorough search of the reference reveals that compression of the type recited by the claim, i.e. compression "based in part on the probability density function" is not shown or disclosed by Kaish.

The Rejection of Claim 1.

The Patent Office suggests that Kaish teaches a compressing using a probability density function at: Column 28, lines 10-15 and Column 27 lines 21-25. The Applicant respectfully disagrees. Moreover, the Office suggests that the Applicant did not claim any particular type of compression. In response, the Applicant submits that compression "based in part on the probability density function" was claimed.

Remarks concerning the Kaish reference.

The Applicant will refer to these sections in turn. Referring to column 28, at lines 10-15, Kaish discloses that vector data is compressed. However, the Applicant respectfully submits that the compression is not based on the limitation recited in the claim, namely that the compression is based in part on the probability density function. Accordingly, the Applicant submits that Kaish fails to show or disclose the recited claim element.

Referring to column 27, at lines 21-25, Kaish discloses that fibers, dye and special light can be used. However, the Applicant respectfully submits that compression based on a probability density function is not shown or disclosed.

Compression based on a Probability Density Function.

As an example only, for purposes of discussion, the Applicant points to the Applicant's specification at pages 20 and on, and Fig. 10 show how probability can be used in compression.

Conclusion.

Therefore, a thorough review of Kaish does not show or disclose the use of compression based on a probability density function. Moreover, the use of such a probability density function in a compression of data is also not shown. Accordingly, the Applicant respectfully requests that the Section 102 rejection of Claim 1 be removed.

Claim 2 has been amended—without conceding the propriety of the rejection and only to advance the prosecution of this application and to further clarify features of the claimed subject matter—to recite a specific algorithm used in the arithmetic coding of vectors. The recited algorithm is supported by page 24 of the Specification. Previously, "encoding the vectors using an arithmetic coding algorithm" was recited. Now, details of the arithmetic coding algorithm are recited. The Applicant submits that Claim 2 is in condition for allowance.

Claims 2—14 depend from Claim 1 and are allowable due to their dependence from an allowable base claim. These claims are also allowable for their own recited features that, in combination with those recited in Claim 1, are not shown and not disclosed in references of record, either singly or in combination with one another.

Claim 15 recites a system comprising:

- an issuer configured to determine randomly distributed features in an authentication object and to compress data representing the randomly distributed features, the issuer being further configured to encode the compressed data with a signature and to create a label that includes the authentication object and the encoded data; and
- wherein the issuer is further configured to determine a probability density function associated with the authentication object, **wherein the probability density function is defined as the likelihood of finding a second end of a fiber at a given location within a non-**

illuminated area when a first end of the fiber is located within an illuminated area of the authentication object, to determine vectors associated with the randomly distributed attributes based, at least in part, on the probability density function, and to encode a portion of the vectors as a path by applying an arithmetic coding algorithm.

Claim 15 has been amended to recite details of the probability density function. In particular, when part of an authentication object is illuminated and part is not illuminated, if a first end of a fiber is in the illuminated area, then the second end of the fiber will release light. Thus, the probability function is the likelihood of that second end (releasing light that entered the first end of the fiber) will be in any given location in the non-illuminated region. The Applicant refers the Examiner to the Applicant's Specification at page 14, particularly lines 9-12.

The Applicant submits that Claim 15, as amended, is allowable for at least the reasons that Claim 1, as amended, was shown to be allowable, above. Accordingly, the Applicant incorporates the remarks from above at this location.

The Applicant submits that Kaish does not show or disclose, among other things, (1) a probability density function, and (2) basing compression in part on the probability density function. Therefore, the Applicant submits that Kaish does not show or disclose elements recited by Claim 15. Accordingly, the Applicant respectfully requests that the Section 102 rejection of Claim 15 be removed.

Moreover, Kaish does not show or disclose determining "wherein the probability density function is defined as the likelihood of finding a second end of a fiber at a given location within a non-illuminated area when a first end of the fiber is located within an illuminated area of the authentication object," as recited by Claim 15, as amended. As discussed extensively above, Kaish does not show or disclose use of a probability density function to determine vectors.

Therefore, a thorough review of Kaish does not show or disclose the use of a probability density function. Moreover, the use of such a probability density function in a compression of data is also not shown. Accordingly, the Applicant respectfully requests that the Section 102 rejection of Claim 15 be removed.

Claims 17—21 depend from Claim 15 and are allowable due to their dependence from an allowable base claim. These claims are also allowable for their own recited features that, in combination with those recited in Claim 15, are not disclosed by reference of record. Moreover, **Claim 17** has been amended to recite aspects of the parameter containment function, as disclosed beginning on page 14 of the Specification. See also figures 6, 7 and 9 on perimeters. Additionally, **Claim 18** has been amended to further recite aspects concerning the ends of the fibers and assumptions made by the perimeter containment function, as seen on the bottom of page 14 of the Specification. **Claim 19** has been amended to recite aspects of the perimeter containment function and edges of the authentication object (see Specification at pages 15 and 16, wherein Area P1, Area P2, etc. are described. For example, see page 15, lines 14-16, where intersection with edges of the authentication object is discussed. **Claim 20** has been amended to indicate a vector encoding type, involving near-minimal bits (see Specification at page 21, lines 13-16).

Claims 22 and 28 are allowable for at least the same reasons that Claims 1 and 15 are allowable, and the remarks from above are incorporated herein by reference.

Claim 22 is allowable for additional reasons. In particular, Claim 22 has been amended to recite the algorithm discussed with respect to amended Claim 2,

regarding arithmetic coding of vectors, and seen at page 24. This algorithm is not seen in the prior art of record; accordingly, the Applicant requests allowance of this claim.

Claim 28 has been amended to recite aspects of the probability density function not seen in the art of record. Accordingly, the Applicant requests allowance of this claim.

Claims 24-27 and 29-30 depend from Claims 22 and 28 and are allowable due to their dependence from an allowable base claim. These claims are also allowable for their own recited features that, in combination with those recited in Claims 22 and 28, are not disclosed by reference of record.

Conclusion

The Applicant submits that all of the claims are in condition for allowance and respectfully requests that a Notice of Allowability be issued. If the Office's next anticipated action is not the issuance of a Notice of Allowability, the Applicant respectfully requests that the undersigned attorney be contacted for the purpose of scheduling an interview.

Interview

The Applicant would very much like to interview the examiner, to discuss the probability function and compression. This could speed resolution of this application.

Respectfully Submitted,

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